

Remarks

Entry of this further Supplementing Amendment along with the earlier filed Supplementing Amendment, dated September 12, 2002, prior to the Examiner taking up the responsive Amendment filed on September 3, 2002 for a formal review is respectfully requested.

In the present Amendment, original claim 13 is also being amended for purposes of clarification as well as to conform the same more closely to that described in the Specification. In that regard, please note, for example, the description in the second sentence in paragraph [0161], on page 38 of the Substitute Specification.

By the present Amendment, also, independent claim 58 is being added in consideration of covering more fully various details associated with the method of manufacture of a semiconductor integrated circuit device of the present invention. Namely, newly presented independent claim 58 combines various details associated with that already contained with regard to independent claims 39 and 43 and, therefore, for the same and similar reasons as that earlier presented, newly added claim 58 should also be deemed allowable. For example, it is noted that claim 48 similarly calls for cleaning of the first insulating film surface prior to the formation of a cap conductive film so as to remove foreign matter or contaminated metal including any remaining conductive film outside of the groove for wiring from the first insulating film. Also, the invention according to independent claim 58 calls for the forming of a cap conductive film on the copper film in the groove by selective growth of the cap conductive film on the copper

film buried in the groove (see claims 39 and 43). Moreover, claim 58 additionally calls for cleaning of the resultant semiconductor substrate with a solution capable of removing foreign matter or contaminant metal (see the last step in claim 43). This additional cleaning is performed subsequently to the formation of the cap conductive film.

According to claim 58, after forming the copper film (26b, 36b) and after removal of the copper film from outside that of the location of the groove (which may also include polishing such as by CMP method), foreign matter and contaminant metal that still remains are removed through effecting a cleaning process of the surface of the insulating film (e.g., 23, 33) such as that called for in step (c). This leads to significant improvements (e.g., see Figs. 27-28, and the discussion beginning in paragraph [0166], on page 40, of the Substitute Specification). Also according to claim 58, after the selective growth of the tungsten film (e.g., cap conductive film 26c, 35c) on the wiring (e.g., 26, 35), an additional cleaning step is added in the process, namely, the surface of the insulating film (e.g., 23, 33) is cleaned such as with a cleaning solution so as to enhance the reliability of the Cu wiring. An example discussion of this is found in paragraphs [0182] – [0190], covering page 44-45, of the Substitute Specification. Through implementing such cleaning processes at such steps in the manufacture of the semiconductor device, yield such as the wiring short-circuiting yield is improved considerably (see the last sentence in paragraph [0171], on page 41, of the Substitute Specification). It is submitted, for the same and similar reasons as that earlier presented and as supplemented herein, claim 58 should be deemed allowable. With regard to this, the earlier discussion regarding the Omura and Uozumi references is applicable herein.

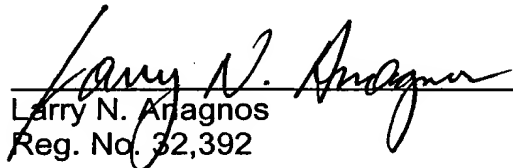
Newly added claim 58 is also considered patentable even over the teachings of Tobben et al as well as over that according to Maeda, both of which were discussed in the earlier Supplementing Amendment of September 12, 2002. With regard to Tobben et al's disclosure, for example, the cleaning process mentioned is directed to removing native oxide from the surface of tungsten layer 110 within the via 122. (Column 4, lines 53-58, and Fig. 4 in Tobben et al.) In fact, the cleaning step before the selective deposition process in the formation of tungsten layer 110 might not be necessary due to the fact that the native oxide on the surface of the tungsten layer is removed after the step of forming the via 122 which exposes the tungsten layer 110, at that time, such as shown in Fig. 4. Accordingly, Tobben et al's cleaning process is directed to the removing of native oxide on the surface of the tungsten layer and, more particularly, is directed to remaining tungsten that may be exposed. In other words, Tobben et al was not concerned, it is submitted, with the growth of tungsten film on a contaminant metal on the silicon oxide film which can lead to breakdown of the selectivity such as discussed in the present specification.

For these and other reasons including that as earlier discussed in the remarks of the responsive Amendment and that of the earlier submitted Supplementing Amendment, favorable action therefor on newly added claim 58, also, is respectfully requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with

the filing of this paper, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Dep. Acct. No. 01-2135 (501.39868X00), and please credit any excess fees to such deposit account.

Respectfully submitted,
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MARKED-UP VERSION SHOWING CHANGES MADE

Please **amend** claims 13, as follows:

13. (Amended) A method for manufacturing a semiconductor integrated circuit device according to Claim 12, wherein said diffusion-preventing insulating film is made of a silicon nitride film, a PSG film, [a silicon carbide film] or a carbon-containing silicon-based insulating film including a silicon carbide (SiC) film or a SiCO film.